

Product News**Cat® C7 ACERT™ Marine Propulsion Engine**

Market	Marine Propulsion
Application	Pleasure Craft and Commercial Vessels
Description	<p>The order board for the C7 ACERT™ “E” rating marine propulsion engine is targeted to open on April 10, 2006. These new engines will be available at 460 and 426 mhp ratings and are EPA Tier 2 and IMO certified. Heat exchanger cooled models are available for both the commercial and pleasure craft markets.</p> <p>This engine’s ACERT™ Technology offers the latest in HEUI™ fuel system, state-of-the-art A4 Electronic Control Unit (ECU), and optimized turbocharging and aftercooling — features that combine to deliver reduced emission levels, excellent fuel economy, and reliable maximum power output.</p> <p>Initially, these new ACERT ratings will only be manufactured in Greenville, South Carolina.</p>
Availability	<p>Launch Materials — April 7, 2006</p> <p>Targeted Order Board Open — April 10, 2006</p> <p>Production — April 2006</p>
Pricing Information	Refer to the C7 MARC outline in the On-Line Price List.

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C7 ACERT E Ratings (Heat Exchanger Cooled)

C7 DITA ACERT

(Pleasure Craft Application — Greenville Production)

C07DM37	460 mhp	(455 bhp)	339 bkW	@ 2800 rpm	PQ0916	271-9070	Port
C07DM38	460 mhp	(455 bhp)	339 bkW	@ 2800 rpm	PQ0917	271-9070	Starboard
C07DM41	426 mhp	(420 bhp)	313 bkW	@ 2800 rpm	PQ0918	271-9068	Port
C07DM42	426 mhp	(420 bhp)	313 bkW	@ 2800 rpm	PQ0919	271-9068	Starboard

C7 DITA ACERT

(Commercial Application — Greenville Production)

C07DM39	460 mhp	(455 bhp)	339 bkW	@ 2800 rpm	PQ1142	280-3346	Port
C07DM40	460 mhp	(455 bhp)	339 bkW	@ 2800 rpm	PQ1143	280-3346	Starboard
C07DM43	426 mhp	(420 bhp)	313 bkW	@ 2800 rpm	PQ1144	280-3345	Port
C07DM44	426 mhp	(420 bhp)	313 bkW	@ 2800 rpm	PQ1145	280-3345	Starboard

C7 DITA ACERT

(Pleasure Craft Application — Gosselies Production)

C07DM45	460 mhp	(455 bhp)	339 bkW	@ 2800 rpm	PQ1146	271-9070	Port
C07DM46	460 mhp	(455 bhp)	339 bkW	@ 2800 rpm	PQ1147	271-9070	Starboard
C07DM49	426 mhp	(420 bhp)	313 bkW	@ 2800 rpm	PQ1148	271-9068	Port
C07DM50	426 mhp	(420 bhp)	313 bkW	@ 2800 rpm	PQ1149	271-9068	Starboard

C7 DITA ACERT

(Commercial Application — Gosselies Production)

C07DM47	460 mhp	(455 bhp)	339 bkW	@ 2800 rpm	PQ1150	280-3346	Port
C07DM48	460 mhp	(455 bhp)	339 bkW	@ 2800 rpm	PQ1151	280-3346	Starboard
C07DM51	426 mhp	(420 bhp)	313 bkW	@ 2800 rpm	PQ1152	280-3345	Port
C07DM52	426 mhp	(420 bhp)	313 bkW	@ 2800 rpm	PQ1153	280-3345	Starboard

Specifications

I-6, 4-Stroke-Cycle-Diesel

Emissions EPA Tier 2 and IMO Compliant

Displacement 7.2 L (439 cu in)

Bore 110 mm (4.33 in)

Stroke 127 mm (5.0 in)

Aspiration Turbocharged-Aftercooled

Governor Electronic

Cooling System Heat Exchanger

Engine Weight

Net Dry (approx) 798.3 kg (1760 lb)

Refill Capacities

Cooling System 39 L (10.3 gal)

Lube Oil System 25 L (6.6 gal)

Dimensions (Drawing Nos. 286-3205/286-3206)

Overall Length — mm (in.) . . 1445.7 (56.92)

From front to rear face

of block 1049.4 (41.31)

From front to end of

flywheel housing 1225.4 (48.24)

Overall Width — mm (in.) . . . 870.1 (34.25)

From crankshaft centerline

to left side 421.8 (16.61)

From crankshaft centerline

to right side 448.3 (17.65)

Overall Height — mm (in.) . . . 921.5 (36.28)

From crankshaft centerline

to top of engine 635.9 (25.03)

From crankshaft centerline

to bottom of oil pan 285.6 (11.25)

Engineering Model E875

Serial Number Prefix C7D (Greenville)

C7Z (Gosselies)

Performance Number DM8122 (460 mhp)

DM8121 (426 mhp)

Service Publications

Parts Book (C7D — Greenville) . . . SEBP4487

Parts Book (C7Z — Gosselies) . . . SEBP4488

Installation Guide (Engine) REHS1187

Installation Guide

(Electronic Displays) SENR5002

Service Manual SENR9825

Operation & Maintenance

Manual SEBU7897

Specifications SENR9827

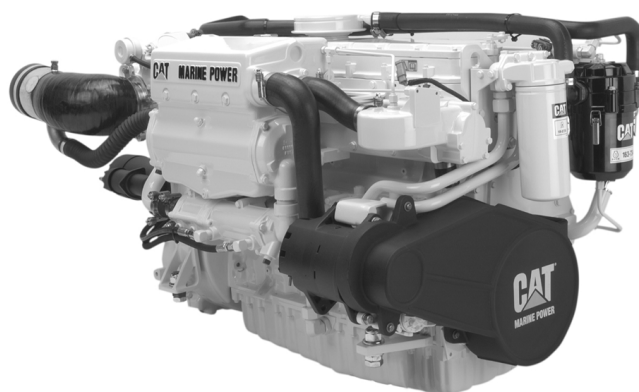
Systems Operation Testing &

Adjusting SENR9828

Disassembly & Assembly RENR7493

Schematic RENR9841

Troubleshooting RENR9313



C7 ACERT™ Marine Propulsion Engine

Marine Engine Performance

Preliminary

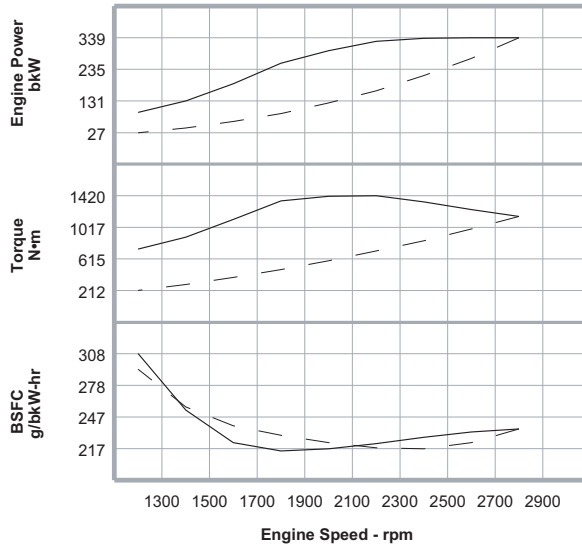
C7 ACERT DITA

339 kW (455 hp) @ 2800 rpm

EPA Tier 2 and IMO Compliant

E Rating (High Performance) — DM7586-00

(to be replaced by DM8122-00)



Metric

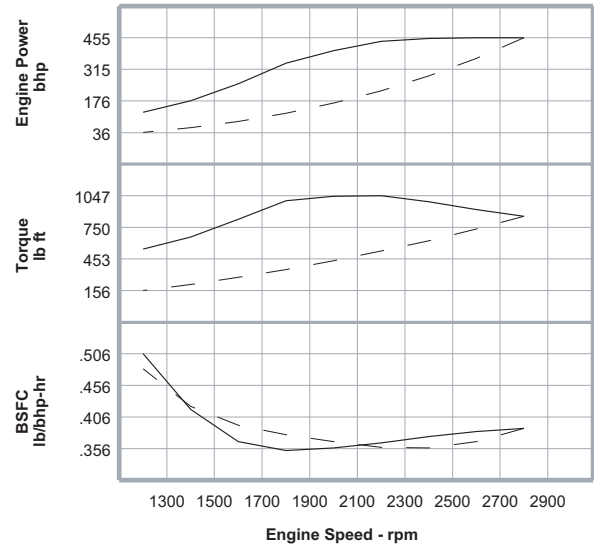
Maximum Power
Prop Demand

339 kW

Preliminary Performance Data

	Engine Speed rpm	Engine Power kW	Engine Torque N·m	BSFC g/kW-hr	Fuel Rate L/hr
Maximum Power Data	2800	339	1156	236.0	95.2
	2600	339	1245	233.0	94.0
	2400	337	1342	228.0	91.4
	2200	327	1420	222.0	86.6
	2000	296	1412	217.0	76.4
	1800	255	1354	215.0	65.3
	1600	187	1118	223.0	49.7
	1400	131	893	254.0	39.6
	1200	93	740	308.0	34.2
Prop Demand Data	2800	339	1156	236.0	95.2
	2600	271	997	223.0	72.1
	2400	214	849	217.0	55.2
	2200	164	714	218.0	42.7
	2000	124	590	223.0	32.9
	1800	90	478	230.0	24.7
	1600	63	378	239.0	18.0
	1400	42	289	257.0	13.0
	1200	27	212	293.0	9.3

Cubic prop demand curve with 3.0 exponent for displacement hulls only.



English

Maximum Power
Prop Demand

455 bhp

Preliminary Performance Data

	Engine Speed rpm	Engine Power bhp	Engine Torque lb ft	BSFC lb/bhp-hr	Fuel Rate gph
Maximum Power Data	2800	455	853	.388	25.1
	2600	455	918	.383	24.8
	2400	452	990	.375	24.1
	2200	439	1047	.365	22.9
	2000	397	1041	.357	20.2
	1800	342	999	.353	17.3
	1600	251	825	.367	13.1
	1400	176	659	.418	10.5
	1200	125	546	.506	9.0
Prop Demand Data	2800	455	853	.388	25.1
	2600	364	735	.367	19.0
	2400	286	626	.357	14.6
	2200	220	527	.358	11.3
	2000	166	435	.367	8.7
	1800	121	353	.378	6.5
	1600	85	279	.393	4.8
	1400	57	213	.423	3.4
	1200	36	156	.482	2.5

Power produced at the flywheel will be within standard tolerances up to 50°C (122°F) combustion air temperature measured at the air cleaner inlet, and fuel temperature up to 52°C (125°F) measured at the fuel filter base. Power rated in accordance with NMMA procedure as crankshaft power. Reduce crankshaft power by 3% for propeller shaft power.

Marine Engine Performance

Preliminary

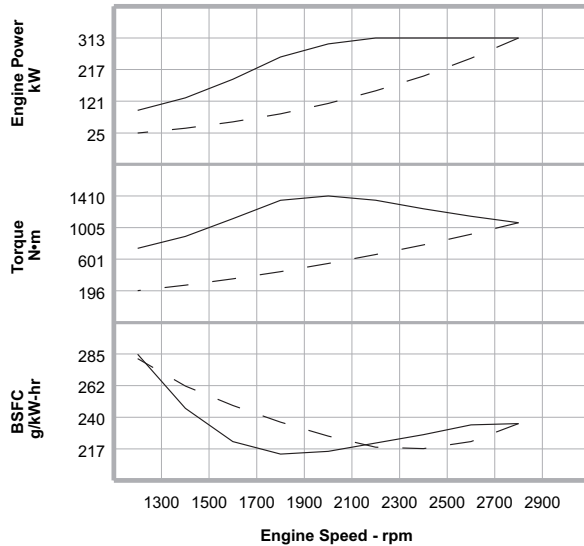
C7 ACERT DITA

313 kW (420 hp) @ 2800 rpm

EPA Tier 2 and IMO Compliant

E Rating (High Performance) — DM7587-00

(to be replaced by DM8121-00)



Metric

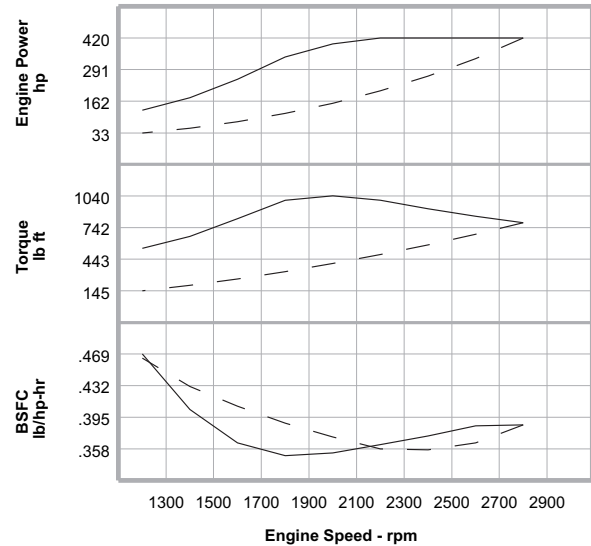
Maximum Power
Prop Demand

313 kW

Preliminary Performance Data

	Engine Speed rpm	Engine Power kW	Engine Torque N·m	BSFC g/kW-hr	Fuel Rate L/hr
Maximum Power Data	2800	313	1067	235.0	87.8
	2600	313	1150	234.0	87.1
	2400	313	1245	227.0	84.8
	2200	313	1359	221.0	82.3
	2000	295	1410	215.0	75.6
	1800	255	1355	213.0	65.0
	1600	187	1118	222.0	49.5
	1400	131	893	246.0	38.4
Prop Demand Data	1200	93	740	285.0	31.6
	2800	313	1067	235.0	87.8
	2600	251	920	222.0	66.3
	2400	197	784	217.0	50.9
	2200	152	659	218.0	39.5
	2000	114	545	226.0	30.7
	1800	83	441	236.0	23.4
	1600	58	349	248.0	17.2
	1400	39	267	262.0	12.2
	1200	25	196	282.0	8.3

Cubic prop demand curve with 3.0 exponent for displacement hulls only.



English

Maximum Power
Prop Demand

420 hp

Preliminary Performance Data

	Engine Speed rpm	Engine Power hp	Engine Torque lb ft	BSFC lb/hp-hr	Fuel Rate gph
Maximum Power Data	2800	420	787	.386	23.2
	2600	420	848	.385	23.0
	2400	420	918	.373	22.4
	2200	420	1002	.363	21.7
	2000	396	1040	.353	20.0
	1800	342	999	.350	17.2
	1600	251	825	.365	13.1
	1400	176	659	.404	10.1
Prop Demand Data	1200	125	546	.469	8.3
	2800	420	787	.386	23.2
	2600	336	679	.365	17.5
	2400	264	578	.357	13.4
	2200	204	486	.358	10.4
	2000	153	402	.372	8.1
	1800	112	325	.388	6.2
	1600	78	257	.408	4.5
	1400	52	197	.431	3.2
	1200	33	145	.464	2.2

Power produced at the flywheel will be within standard tolerances up to 50°C (122°F) combustion air temperature measured at the air cleaner inlet, and fuel temperature up to 52°C (125°F) measured at the fuel filter base. Power rated in accordance with NMMA procedure as crankshaft power. Reduce crankshaft power by 3% for propeller shaft power.

Standard Equipment

Air Inlet System

Sea water aftercooler, 12V air inlet heater, air cleaner with fumes disposal (closed system), turbocharger

Control System

Electronic governor, HEUI fuel system, ECU, engine mounted 70-pin dedicated customer connector, SAE J1939 data link

Cooling System

Gear-driven auxiliary sea water pump, belt-driven centrifugal jacket water pump, auxiliary sea water lines, expansion tank, engine oil cooler, transmission oil cooler, engine-mounted heat exchanger with removable tube bundle and replaceable copper-nickel tubes, thermostat and housing

Exhaust System

Watercooled exhaust manifold and turbocharger, fumes disposal routed to turbocharger inlet

Flywheels & Flywheel Housings

SAE No. 3 flywheel, 126 teeth, SAE No. 3 flywheel housing

Fuel System

Fuel transfer pump, fuel priming pump, fuel filter — RH or LH service

Lube System

Crankcase breather, oil filter — front center service, oil level gauge — RH or LH service, oil filler — RH or LH service, oil pan, oil pan drain — RH or LH service, gear-driven engine oil pump, lubricating oil

Mounting System

Front mount is not included. (Do not use shipping mounts in permanent installation.)

Protection System

Electronic overspeed shutoff

General

Torsional vibration damper and guard, lifting eyes, engine preservation

ISO Certification

Factory-designed systems built at Caterpillar ISO9001:2000 certified facilities

Optional Attachments

Cooling System

Coolant recovery tank
Coolant level sensor
Cooler

Exhaust System

Elbows
Flexible fitting
Flange

Fuel System

Water separator
Fuel cooler
Flexible fuel lines
Fuel temperature sensor

Instrumentation

OEM wiring harness
Engine to engine harness
Gauges and instrument panels
Wiring harness
Magnetic pickup

Lube System

Manual sump pumps and lines
Oil fillers

Mounting System

Vibration isolators
Front engine support

Power Take-Offs

Crankshaft pulley

Protection System

Alarm contactor

Starting System

Electric starting motors, 12V or 24V
Starting aid

General

Belt guard removal
Cover — Turbo air outlet

Literature

Optional literature (other languages than English)
Extra literature (English and other languages)

Decals

Decals for all engines

Packing

Engine protective cover
Export packing

Features and Benefits

- EPA Tier 2 and IMO compliant
 - Pleasure craft ratings certified to 2006 EPA Marine Tier 2 Recreational Emissions Standards
 - Commercial ratings certified to 2004 EPA Marine Tier 2 Commercial Emissions Standards
- Excellent power-to-weight ratio
- Little or no visible white or black smoke
- Higher compression ratio than current C7, resulting in less start-up smoke
- Improved transient response
- Same dimensions as current C7
- Standard Caterpillar warranty
- Parts and service support from worldwide dealer organization

C7 ACERT Enhancements

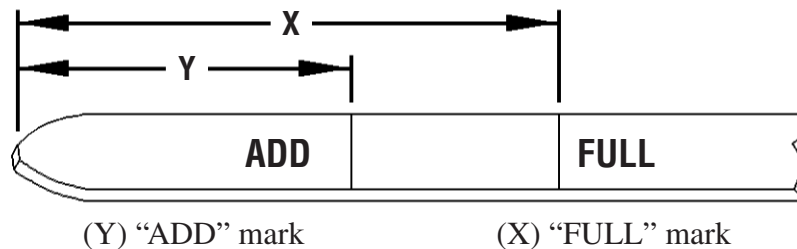
- A4 Electronic Control Unit (ECU)
- HEUI fuel pump
- HI 315B injectors
- Higher compression monosteel pistons

C7 ACERT Versus Competition

	Cat C7 ACERT	Yanmar 6CXM-GTE2	Cummins 480C-E	Volvo TAMD75P EDC
Power — mhp (bhp)	460 (455)	500 (493)	480 (473)	480 (473)
Engine Speed — rpm	2800	2900	2600	2600
Configuration	I-6	I-6	I-6	I-6
Bore — mm (in.)	110 (4.3)	110 (4.3)	114 (4.5)	107 (4.2)
Stroke — mm (in.)	127 (5.0)	130 (5.1)	135 (5.3)	135 (5.3)
Displacement — L (cu. in.)	7.24 (441.81)	7.413 (452.37)	8.3 (506.50)	7.28 (444.25)
Weight — kg (lbs)	798.3 (1760)	840 (1852)	853 (1891)	860 (1896)
Ratio — kg/mhp (lbs/bhp)	1.73 (3.87)	1.68 (3.76)	1.79 (4.01)	1.79 (4.01)
Fuel Consumption — g/bkW-hr (lb/bhp-hr)	235 (.385)	N/A	238 (.390)	233 (.382)
Fuel System	Full Electronic	Full Electronic	Full Electronic	Full Electronic

Installation Information

Oil Level Gauge



Calibration of Oil Level Gauge

ENGINE OIL LEVEL GAUGE		
Angle ¹	“FULL” Mark (X) mm (in.)	“ADD” Mark (Y) mm (in.)
10 degrees	125 (4.92)	114 (4.49)
9 degrees	124 (4.89)	106 (4.17)
8 degrees	122 (4.80)	102 (4.02)
7 degrees	120 (4.72)	96 (3.78)
6 degrees	115 (4.53)	89 (3.50)
5 degrees	110 (4.33)	81 (3.19)
4 degrees	101 (3.98)	71 (2.80)
3 degrees	94 (3.70)	66 (2.60)
2 degrees	90 (3.54)	59 (2.32)
1 degree	82 (3.23)	52 (2.05)
0 degrees	76 (2.99)	46 (1.81)
-1 degree	65 (2.56)	39 (1.54)
-2 degrees	59 (2.32)	33 (1.30)
-3 degrees	53 (2.09)	26 (1.02)
-4 degrees	46 (1.81)	20 (0.79)
-5 degrees	39 (1.54)	12 (0.47)

Verifying the Calibration of the Oil Level Gauge

Caterpillar recommends verifying the calibration of the oil level gauge at the first oil change. Use the following procedure to verify the “FULL” mark on the oil level gauge:

Note: The vessel must be level in order to perform this procedure.

1. Operate the engine until normal operating temperature is achieved. Stop the engine. Remove one of the drain plugs for the engine crankcase. Allow the engine oil to drain.

2. Remove the used engine oil filter. Install the new engine oil filter. Install the crankcase drain plug and tighten the crankcase drain plug.
3. Add 25 L (26.5 qt) of the recommended oil grade and weight of engine oil to the crankcase.

Note: The engine may be equipped with auxiliary engine oil filters which require additional oil. Refer to the OEM specifications.

NOTICE

To help prevent crankshaft or bearing damage, crank engine to fill all filters before starting. Do not crank engine for more than 30 seconds.

NOTICE

Do not crank the engine for more than 30 seconds. Allow the starting motor to cool for two minutes before cranking again.

Turbocharger (if equipped) damage can result if the engine rpm is not kept low until the engine oil light/gauge verifies the oil pressure is sufficient.

4. Start the engine. Ensure that the lubrication system and the new engine oil filter is filled. Inspect the lubrication system for leaks.
5. Stop the engine and allow the engine oil to drain into the engine crankcase for approximately ten minutes.
6. Check the engine oil level. If necessary, use a marking pen in order to correct the “FULL” mark (X).

C7 ACERT Installation Information

Air Intake System

Inlet air restriction — 15" H₂O (new air cleaner), 26.1" H₂O (dirty air cleaner)

Maximum air inlet temperature — 49°C (120°F)

Suggested ventilation airflow including combustion air — 27.6 m³/min (974.7 cfm)

Maximum engine compartment temperature — 49°C (120°F)

Center of Gravity

X dimension from rear face of cylinder block — 391.9 mm (15.43 in)

Y dimension from crankshaft centerline — 168.9 mm (6.65 in)

Z dimension left of crankshaft centerline — 27.0 mm (1.063 in)

Cooling System

Sea water inlet hose diameter — 51 mm (2.01 in)

Sea water outlet hose diameter — 44.5 mm (1.75 in)

Sea water flow — 261.4 L/min (69 gal/min) at 79.3 kPa (11.5 psi) external restriction

Maximum sea water temperature — 32°C (90°F)

Exhaust System

Exhaust gas flow — 64.2 m³/min (2267.2 cfm)

Maximum exhaust restriction — 40" H₂O

Fuel System

Fuel supply line — 168 Lph (44.4 gph) (13.9 kPa max. restriction)

Fuel return line — 92.52 Lph (24.4 gph) (70.1 kPa max. restriction)

Normal fuel pressure — 600 kPa (87 psi) (clean system)

Maximum fuel consumption at rated speed and load — 95.2 Lph (25.1 gph)

Lubrication System

Normal oil pressure w/SAE 10W30

@ 99°C (210° F) — 262 kPa (38 psi)

Minimum low idle oil pressure w/SAE 10W30

@ 99°C (210° F) — 131 kPa (19 psi)

Maximum installation angle (+ planing angle) — 15° max. installation angle, 45° max. operating angle

System Configuration Parameters

Parameter	Available Range or Options	Default	Password
ECU Identification Parameters			
Equipment ID	17 alphanumeric characters	“NOT PROGRAMMED”	Customer
Engine Serial Number	0XX00000 or XXX00000	“0XX00000”	Factory
Engine/Gear Parameters			
Engine Location	Port, Center, Starboard, 1, 2, 3, 4, 5	Port	Customer
Number of Synchronized Engines Configuration	1, 2, 3, 4, 5	1	Customer
FLS	Programmed at the Factory		Factory
FTS	Programmed at the Factory		Factory
Low Idle Speed	550 rpm to 750 rpm	600 rpm	Customer
Maximum Trolling Speed	751 rpm to 1200 rpm	900 rpm	Customer
Secondary Throttle Enable Status	Enabled or Disabled	Disabled	Customer
Optional Parameters			
Transmission Oil Temperature Sensor Installation Status	Installed or Not Installed	Not Installed	Customer
Transmission Oil Pressure Sensor Installation Status	Installed or Not Installed	Not Installed	Customer
Fuel Level Sensor Installation Status	Installed or Not Installed	Not Installed	Customer
Coolant Level Sensor Installation Status	Installed or Not Installed	Not Installed	Customer
Exhaust Temp. Sensor Installation Status	Installed or Not Installed	Not Installed	Customer
Air Inlet Heater Installation Status	Installed or Not Installed	Not Installed	Customer
Maintenance Parameters			
Engine Oil Capacity	N/A	N/A	Customer
Fuel Correction Error	-63.5 to +63.5	0	Customer
Maintenance Indicator Mode	Off, Man Hour, Auto Hour, Man Fuel, or Auto Fuel	N/A	Customer
PM1 Interval	N/A	N/A	Customer
Passwords			
Customer Password #1	8 alphanumeric characters	Blank	Customer
Customer Password #2	8 alphanumeric characters	Blank	Customer
Security Access Parameters			
Total Tattletale	0 to 65535	0	Read Only ¹

¹This parameter can only be viewed. No changes are allowed.

Parameter Descriptions

Selected Engine Rating

Rating Number

The “Rating Number” corresponds to the selected set of performance maps for the application. The selected set of performance maps are derived from several unique sets of maps that are in the flash file. The dealer and/or the OEM will need to select the appropriate rating tier, if more than one rating tier is present. The rating tiers are A through E.

ECU Identification Parameters

Equipment ID

The “Equipment ID” parameter allows the customer to enter a description into the ECU in order to identify the engine’s application. A maximum of 17 characters can be entered in the field.

Engine Serial Number

Program the “Engine Serial Number” to match the engine serial number that is stamped on the engine information plate. The engine serial number is not preprogrammed on a replacement ECU.

Engine/Gear Parameters

Engine Location

Note: The “Number of Synchronized Engines Configuration,” “Engine Location,” and “Secondary Throttle Enable Status” must be programmed in the following order:

- Number of synchronized engines configuration
- Engine location
- Secondary throttle enable status

This parameter can be set to one of the following values:

- Port
- Starboard
- Center
- Engine #X (X is the engine number)

Number of Synchronized Engines Configuration

Note: The “Number of Synchronized Engines Configuration,” “Engine Location,” and “Secondary Throttle Enable Status” must be programmed in the following order:

- Number of synchronized engines configuration
- Engine location
- Secondary throttle enable status

Program this parameter to the number of synchronized engines that are used in the application. The allowable range is from 1 to 5. The default value is 1.

If this parameter is programmed for more than one engine, the “Secondary Throttle Enable Status” parameter is automatically set to “Enabled.”

FLS (Full Load Setting)

This parameter represents the adjustment to the fuel system that was made at the factory in order to fine tune the fuel system. The correct value for this parameter is stamped on the engine information plate. Factory passwords are required in order to change this parameter.

Parameter Descriptions cont.

FTS (Full Torque Setting)

This parameter is similar to “FLS.” Factory passwords are required in order to change this parameter.

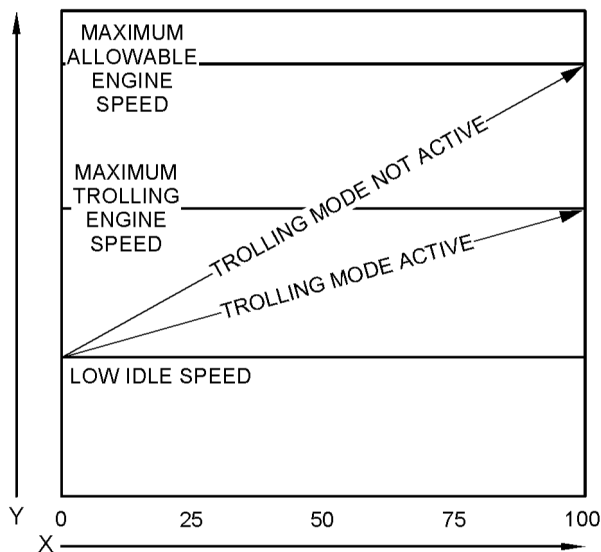
Compare the values of the FLS and the FTS from the ECU with the values that are listed on the engine information plate. The FLS and the FTS should only be changed after a mechanical change is made to the engine. Entering the wrong values can cause damage to the engine. Entering the wrong values may also void the Caterpillar warranty.

Low Idle Speed

This parameter is the engine’s minimum allowable operating speed. The allowable range is from 550 to 750 rpm.

Maximum Trolling Engine Speed

The ECU must limit the engine speed when the engine is in trolling mode. This prevents damage to the clutch. The maximum engine speed is set to the value of this parameter when the engine is in trolling mode. The value of this parameter must be higher than the value of the “Low Idle Speed” parameter.



Engine speed versus throttle position

(X) Throttle position

(Y) Engine speed

Secondary Throttle Enable Status

Note: The “Number of Synchronized Engines Configuration,” “Engine Location,” and “Secondary Throttle Enable Status” must be programmed in the following order:

- Number of synchronized engines configuration
- Engine location
- Secondary throttle enable status

This parameter can be programmed to “Enabled” or “Disabled.” If the “Number of Synchronized Engines Configuration” parameter is programmed to more than one engine, this parameter is automatically set to “Enabled.”

Refer to Troubleshooting, “Engine Synchronize Switch Circuit — Test” for more information on the secondary throttle.

Optional Parameters

Transmission Oil Temperature Sensor

This parameter can be set to “Installed” or to “Not Installed.” Setting this parameter to “Not Installed” disables monitoring of the circuit for the transmission oil temperature sensor.

Transmission Oil Pressure Sensor

This parameter can be set to “Installed” or to “Not Installed.” Setting this parameter to “Not Installed” disables fault monitoring of the circuit for the transmission oil pressure sensor.

Fuel Level Sensor Installation Status

This parameter can be programmed to “Installed” or to “Not Installed.” If this parameter is programmed to “Installed,” the monitoring system can be programmed to alert the operator when the fuel level is low.

Parameter Descriptions cont.

Coolant Level Sensor Installation Status

This parameter can be programmed to “Installed” or to “Not Installed.” If this parameter is programmed to “Installed,” the monitoring system can be programmed to alert the operator when the coolant level is low.

Exhaust Temperature Sensor Installation Status

This parameter can be programmed to “Installed” or to “Not Installed.” Setting this parameter to “Installed” enables monitoring of the circuit for the exhaust temperature sensor.

Air Inlet Heater Installation Status

This parameter can be programmed to “Installed” or to “Not Installed.” If this parameter is programmed to “Installed,” the cold start capability of the the engine is improved and white smoke is reduced.

Maintenance Parameters

Engine Oil Capacity

Program this parameter to match the actual engine oil capacity in quarts.

Fuel Correction Error

The Fuel Correction Factor (FCF) fine tunes all of the fuel data that will be stored in the future by the ECU. Caterpillar recommends changing the FCF only after an operating interval that allows a comparison of actual fuel economy to the fuel economy that is calculated by the ECU for typical operating conditions. The allowable range is -63.5 to +63.5.

Calculating the Error

Error = [(Actual fuel economy - Economy calculated by the ECU) ÷ Actual fuel economy] x 100

Calculating the New Fuel Correction Factor

New FCF = Old FCF + [(100 + Old FCF) x Error] ÷ 100

Note: The old FCF is the FCF that is currently programmed in the ECU.

Maintenance Indicator Mode

The ECU records data that is related to equipment maintenance. The ECU will activate the maintenance indicator lamp when scheduled maintenance is due. The maintenance indicator lamp can be reset by activating the maintenance clear switch or via Cat ET.

The maintenance interval can be based on operating hours or on fuel consumption. This parameter can be set to one of the following values:

- Off
- Man Hour
- Auto Hour
- Man Fuel
- Auto Fuel

PM1 Interval

This parameter allows the customer to define the maintenance interval if the “Maintenance Indicator Mode” parameter is programmed to a manual option. Refer to the Operation and Maintenance Manual for additional information.

Passwords

Customer Password #1

This parameter allows the customer to lock out certain parameters by entering a password. Customer passwords must be used to unlock any parameters that are protected by customer passwords before the parameter can be changed. Factory passwords are required if this password is lost.

Customer Password #2

This parameter allows the customer to lock out certain parameters by entering a password. Customer passwords must be used to unlock any parameters that are protected by customer passwords before the parameter can be changed. Factory passwords are required if this password is lost.

Maintenance Schedule (High Performance)

S/N: C7D1-Up

S/N: C7Z1-Up

Ensure that all safety information, warnings, and instructions are read and understood before any operation or any maintenance procedures are performed.

The user is responsible for the performance of maintenance, including all adjustments, the use of proper lubricants, fluids, filters, and the replacement of components due to normal wear and aging. Failure to adhere to proper maintenance intervals and procedures may result in diminished performance of the product and/or accelerated wear of components.

Use mileage, fuel consumption, service hours, or calendar time, **WHICHEVER OCCURS FIRST**, in order to determine the maintenance intervals. Products that operate in severe operating conditions may require more frequent maintenance.

Note: Before each consecutive interval is performed, all maintenance from the previous interval must be performed.

When Required

Battery – Replace

Battery or Battery Cable – Disconnect

Engine Oil Level Gauge – Calibrate

Engine Storage Procedure – Check

Fuel System – Prime

Daily

Closed Crankcase Ventilation (CCV) Filter

Service Indicator – Inspect

Cooling System Coolant Level – Check

Engine Air Cleaner Service Indicator – Inspect

Engine Oil Level – Check

Fuel system Primary Filter/Water Separator –
Drain

Marine Transmission Oil Level – Check

Walk-Around Inspection

Initial 250 Service Hours (or at first oil change)

Injector Bolt Torque – Check

Every 250 Service Hours

Engine Oil Sample – Obtain

Every 500 Service Hours

Cooling System Coolant Sample (Level 1) –
Obtain

Every Year

Cooling System Coolant Sample (Level 2) –
Obtain

Every 1400 L (375 U.S. gal) of Fuel or 50 Service Hours

Zinc Rods – Inspect/Replace

Every 5700 L (1500 U.S. gal) of Fuel or 150 Service Hours for Engines Used in Severe Applications

Engine Oil and filter – Change

Maintenance Schedule (High Performance) cont.

First 5700 L (1500 U.S. gal) of Fuel or 250 Service Hours

Engine Valve Lash – Inspect/Adjust

PM Level 1 – Every 7100 (1850 U.S. gal) of Fuel or 250 Service Hours or 6 Months

Aftercooler Condensate Drain Valve –
Inspect/Clean

Alternator Belt – Inspect/Adjust/Replace

Auxiliary Water Pump – Inspect

Battery Electrolyte Level – Check

Cooling System Supplemental Coolant
Additive (SCA) – Test/Add

Engine Air Cleaner Element – Clean/Replace

Engine Crankcase Breather – Clean

Engine Oil and Filter – Change

Fuel System Primary Filter/Water Separator
Element – Replace

Fuel System Secondary Filter – Replace

Fuel Tank Water and Sediment – Drain

Grounding Stud – Inspect/Clean/Tighten

Hoses and Clamps – Inspect/Replace

Sea Water Strainer – Clean/Inspect

Every 17 000 L (4500 U.S. gal) of Fuel or 600 Service Hours

Closed Crankcase Ventilation (CCV) Fumes

Disposal Filter – Replace

Turbocharger – Inspect

PM Level 2 – Every 28 400 L (7500 U.S. gal) of Fuel or 1000 Service Hours or 2 Years

Aftercooler Core – Clean/Test

Heat Exchanger – Inspect

Injector Bolt Torque – Check

Every 30 000 L (8000 U.S. gal) of Fuel or 1000 Service Hours or 2 Years

Engine Speed/Timing Sensors –

Check/Clean/Calibrate

Every 85 200 L (22,500 U.S. gal) of Fuel or 3000 Service Hours or 3 Years

Cooling System Coolant (DEAC) – Change

Cooling System Coolant Extender (ELC) –
Add

PM Level 3 – Every 56 800 L (15,000 U.S. gal) of Fuel or 2000 Service Hours

Alternator – Inspect

Cooling System Water Temperature Regulator
– Replace

Crankshaft Vibration Damper – Inspect

Engine Mounts – Inspect

Engine Valve Lash – Inspect/Adjust

Engine Valve Rotators – Inspect

Starting Motor – Inspect

Water Pump – Inspect

Every 170 400 L (45,000 U.S. gal) of Fuel or 6000 Service Hours or 6 Years

Cooling System Coolant (ELC) – Change

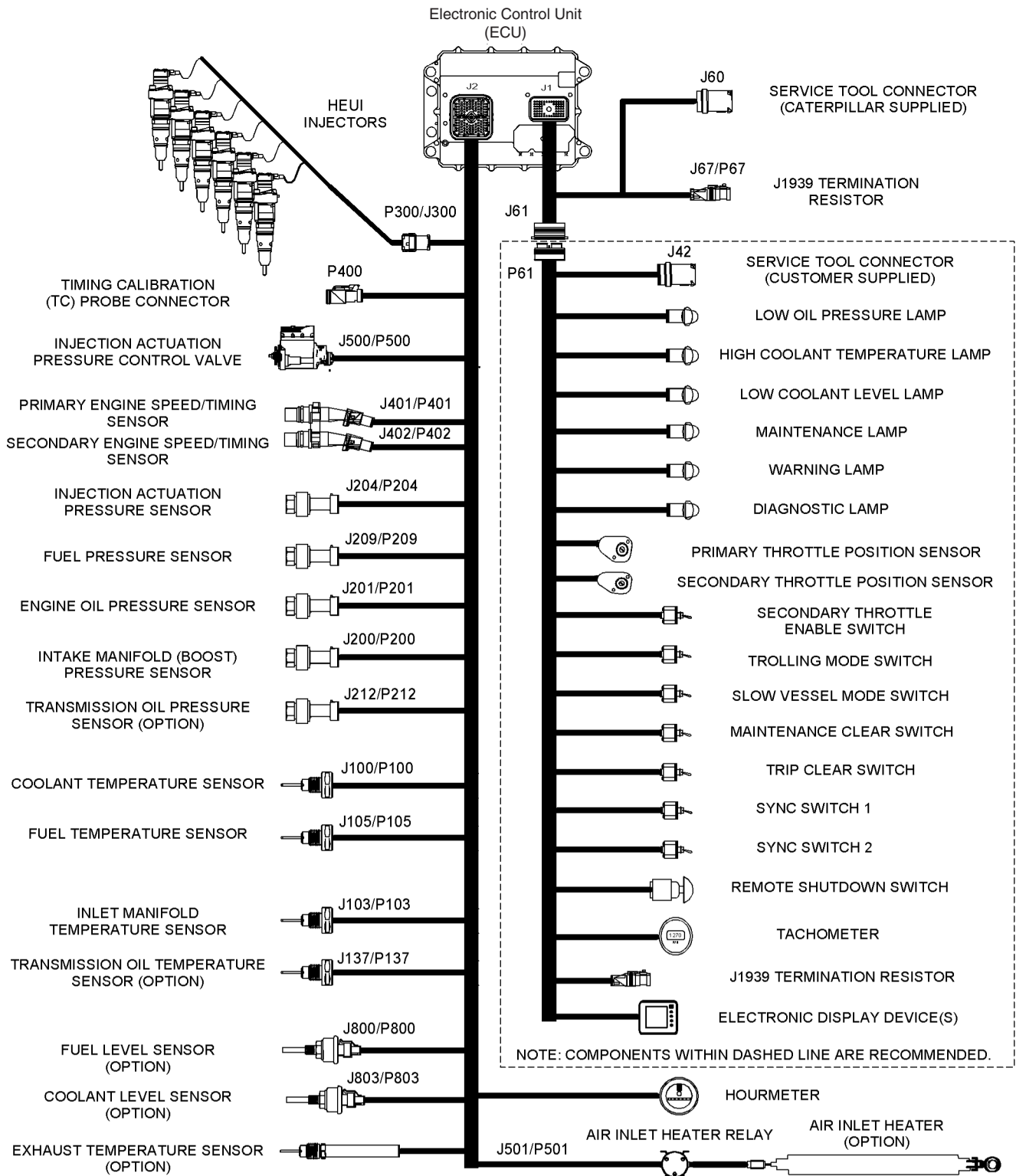
Overhaul

Overhaul Considerations

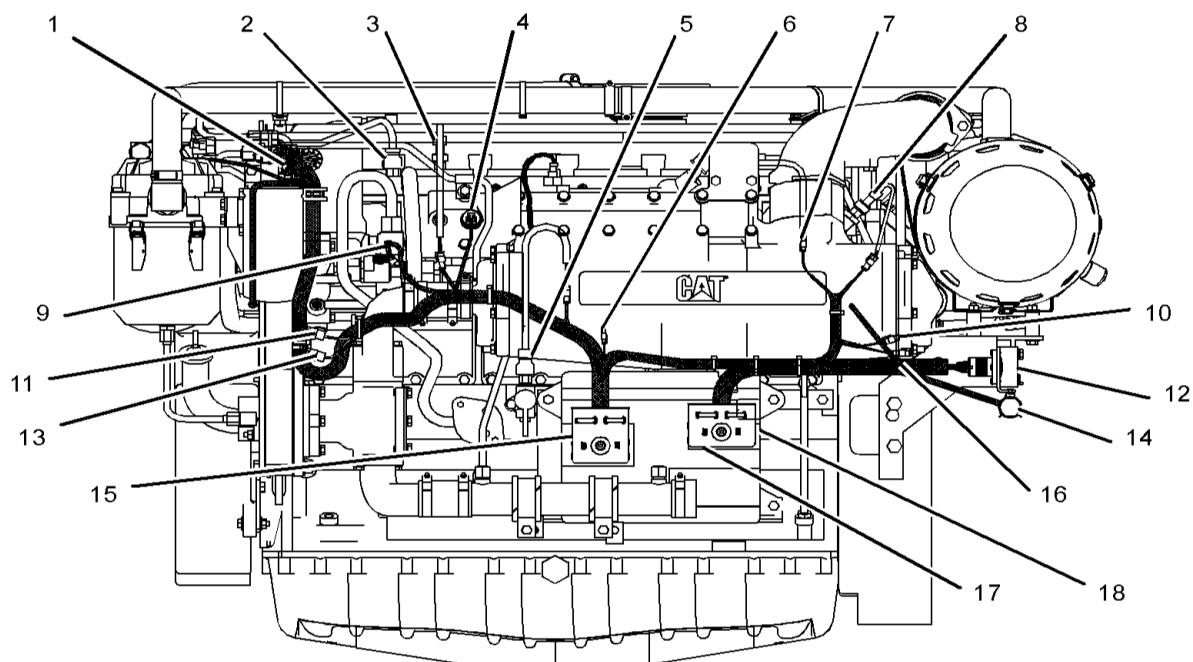
Sensors and Electrical Connectors

Connector	Function
J1	Electronic Control Unit (ECU) Connector
J2	ECU Connector
J60	Service Tool Connector
J61	Customer Connector
J67/P67	J1939 Termination Resistor
J100/P100	Coolant Temperature Sensor
J103/P103	Intake Manifold Air Temperature Sensor
J105/P105	Fuel Temperature Sensor
J137/P137	Marine Transmission Oil Temperature Sensor
J200/P200	Boost Pressure Sensor
J201/P201	Engine Oil Pressure Sensor
J204/P204	Injection Actuation Pressure Sensor
J209/P209	Fuel Pressure Sensor
J212/P212	Marine Transmission Oil Pressure Sensor
J300/P300	HEUI Injectors
P400	Engine Timing Calibration
J401/P401	Primary Engine Speed/Timing Sensor
J402/P402	Secondary Engine Speed/Timing Sensor
J500/P500	Injection Actuation Pressure Control Valve
J501/P501	Air Inlet Heater Relay
J800/P800	Fuel Level Sensor
J803/P803	Engine Coolant Level Sensor

Sensors and Electrical Connectors



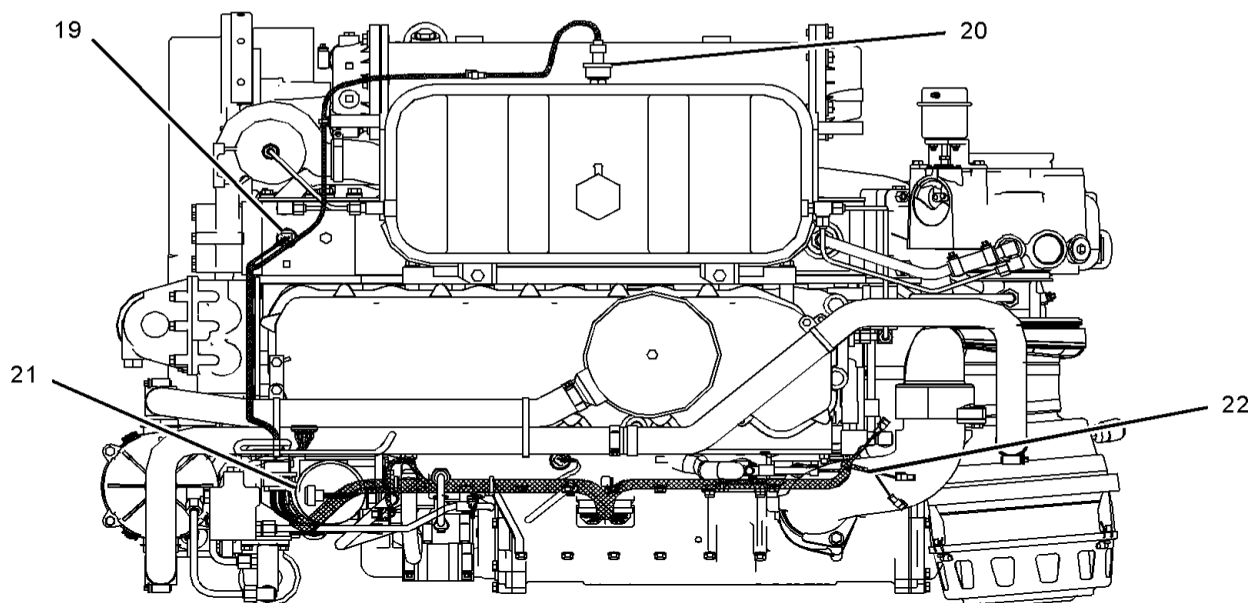
Component Locations



Typical left side engine view

- | | | |
|---|--|---|
| (1) Unit injector wiring harness connector | (8) Fuel pressure sensor | (15) ECU connector J2/P2 |
| (2) Injection actuation pressure sensor | (9) Injection actuation pressure control valve | (16) Connector for the transmission temperature sensor (option) |
| (3) Intake manifold (boost) pressure sensor | (10) Connector for the transmission pressure sensor (option) | (17) ECU connector J1/P1 |
| (4) Intake manifold temperature sensor | (11) Primary engine speed/timing sensor | (18) Electronic Control Unit (ECU) |
| (5) Engine oil pressure sensor | (12) Customer connector | |
| (6) Timing calibration probe connector | (13) Secondary engine speed/timing sensor | |
| (7) Connector for the air inlet heater relay (option) | (14) Service tool connector | |

Component Locations cont.



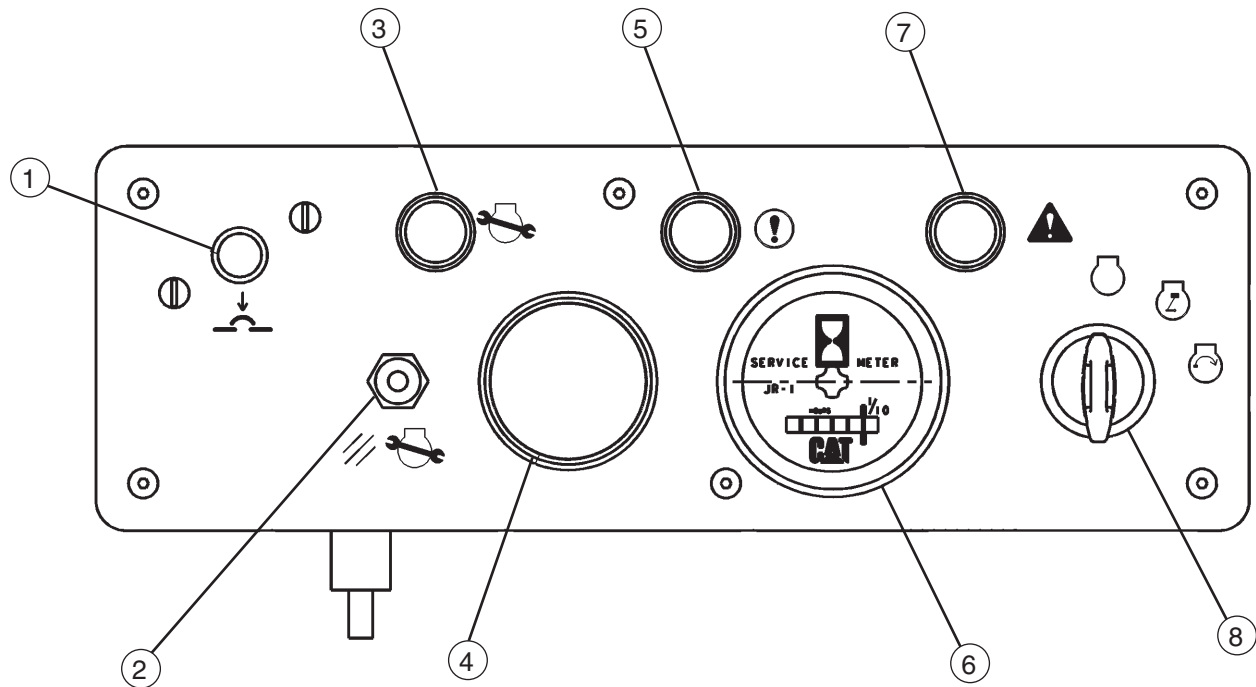
Typical top engine view

(19) Coolant temperature sensor
(20) Coolant level sensor (option)

(21) Connector for the fuel temperature
sensor (option)

(22) Connector for the fuel level sensor
(option)

Engine Control Panel



- (1) 15 amp circuit breaker for control panel
- (2) Maintenance clear switch
- (3) Maintenance overdue lamp
- (4) Engine shutdown switch

- (5) Diagnostic lamp
- (6) Hour meter
- (7) Warning lamp
- (8) Keyswitch

[illegible]

Oil Filter
Removal Distance = 24.5 [0.96]

(917) FUEL PRESSURE
9/16-18 THD
(NO. 6 PORT)

FUEL FILTER
Removal Distance = 24.5 [0.96]

FUEL PRIMING PUMP

(918) JACKET OUTLET WATER PRESSURE/
(919) JACKET WATER PRESSURE AT PUMP OUTLET/
(902) JACKET WATER PUMP OUTLET TEMPERATURE
1-1/16-12 TAP
(NO. 12 PORT)

OIL FILLER

TRANSMISSION OIL COOLER OUTLET

(926) MARINE GEAR COOLER OUTLET WATER TEMPERATURE

OIL DRAIN

CENTERLINE OF ENGINE

CENTERLINE OF CRANKSHAFT

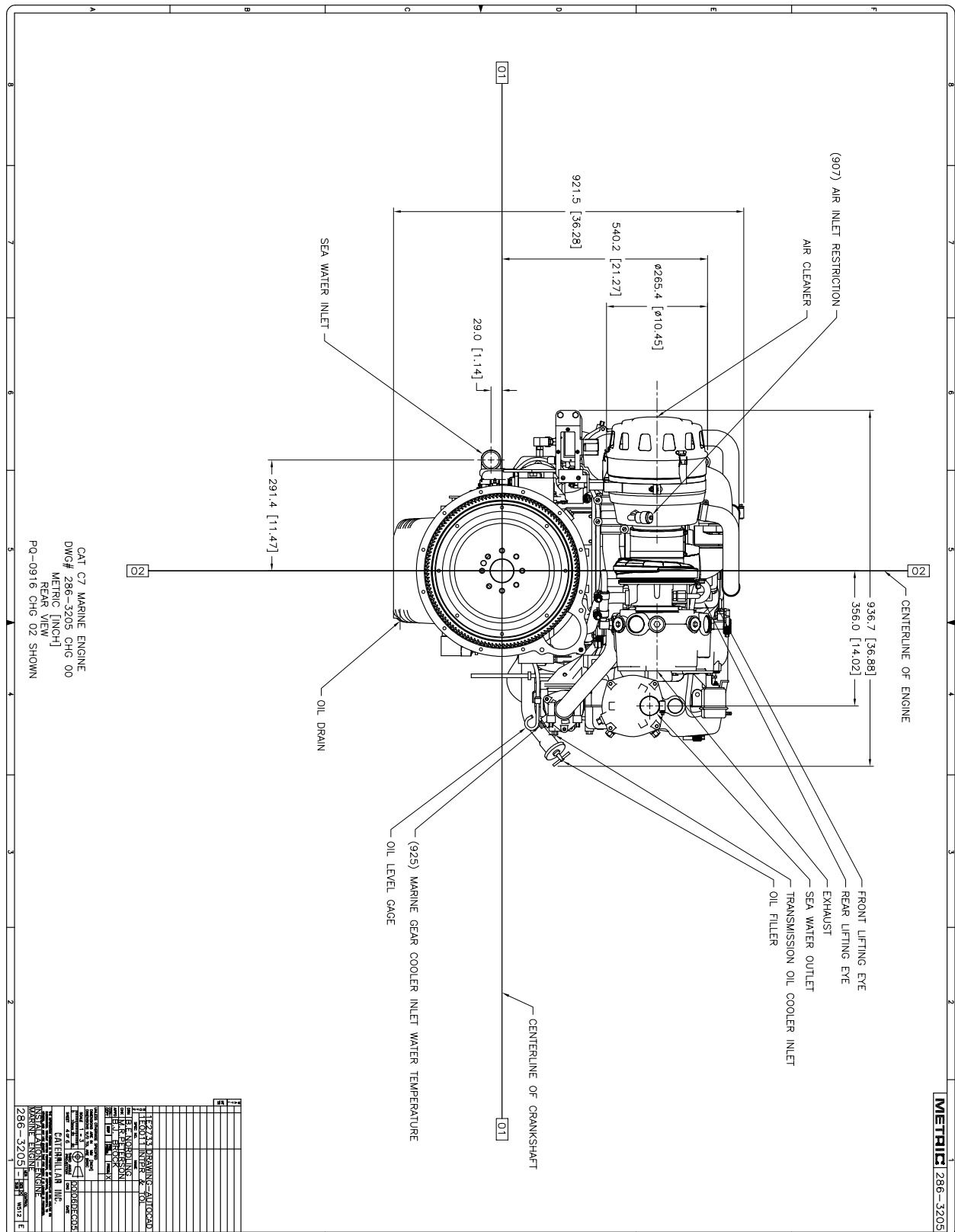
Dimensions (inches [millimeters]):

- 513.7 [20.22]
- 286.1 [11.26]
- 235.0 [9.25]
- 514.9 [20.27]
- 425.4 [16.75]
- 936.7 [36.86]
- 421.8 [16.61]
- 288.0 [11.34]
- 635.9 [25.03]
- 921.5 [36.28]
- 124.5 [4.90]
- 26.8 [1.06]
- 261.8 [10.31]
- 241.9 [9.52]

Labels:

- (902) FUEL PUMP OUTLET TEMPERATURE
3/4-16 THD
(NO. 8 PORT)
- FUEL INLET
- (935) FUEL INLET TEMPERATURE
11/16-16 THD
(NO. 6 PORT)

Dimension Drawings — 286-3205



Technical drawing of a CAT C7 Marine Engine, top view. The drawing shows the engine block, fuel system, and various components with dimensions in inches and millimeters.

Dimensions:

- 253.9 [10.00]
- 2.0 [0.08]
- 1445.7 [56.92]
- 936.7 [36.88]
- 399.8 [15.74]
- 197.6 [7.78]
- 263.4 [10.37]
- 218.0 [8.58]
- 294.0 [11.57]

Components and Labels:

- REAR FACE OF CYLINDER BLOCK
- EXCESS FUEL RETURN
- AIR CLEANER REMOVAL DISTANCE = 105.5 [4.15]
- FUMES DISPOSAL TUBE
- (907) AIR INLET RESTRICTION
- LIFTING EYE
- BREATHER
- CENTERLINE OF ENGINE
- FUEL FILTER
- FUEL PRIMING PUMP MAXIMUM STROKE = 41.7 [1.64]
- (950) WATER PRESSURE TO TEMPERATURE REGULATOR FROM SINGLE CIRCUIT HEAT EXCHANGER/ (945) WATER TEMPERATURE TO TEMPERATURE REGULATOR FROM COMBINED CIRCUIT HEAT EXCHANGER/ (901) JACKET WATER OUTLET TEMPERATURE 1/2-14 PIPE TAP
- CAB HEATER SUPPLY 1-1/16-12 THD (NO. 12 PORT)
- FILLER CAP
- OIL FILLER
- SEA WATER OUTLET
- EXHAUST
- LIFTING EYE

Specifications:

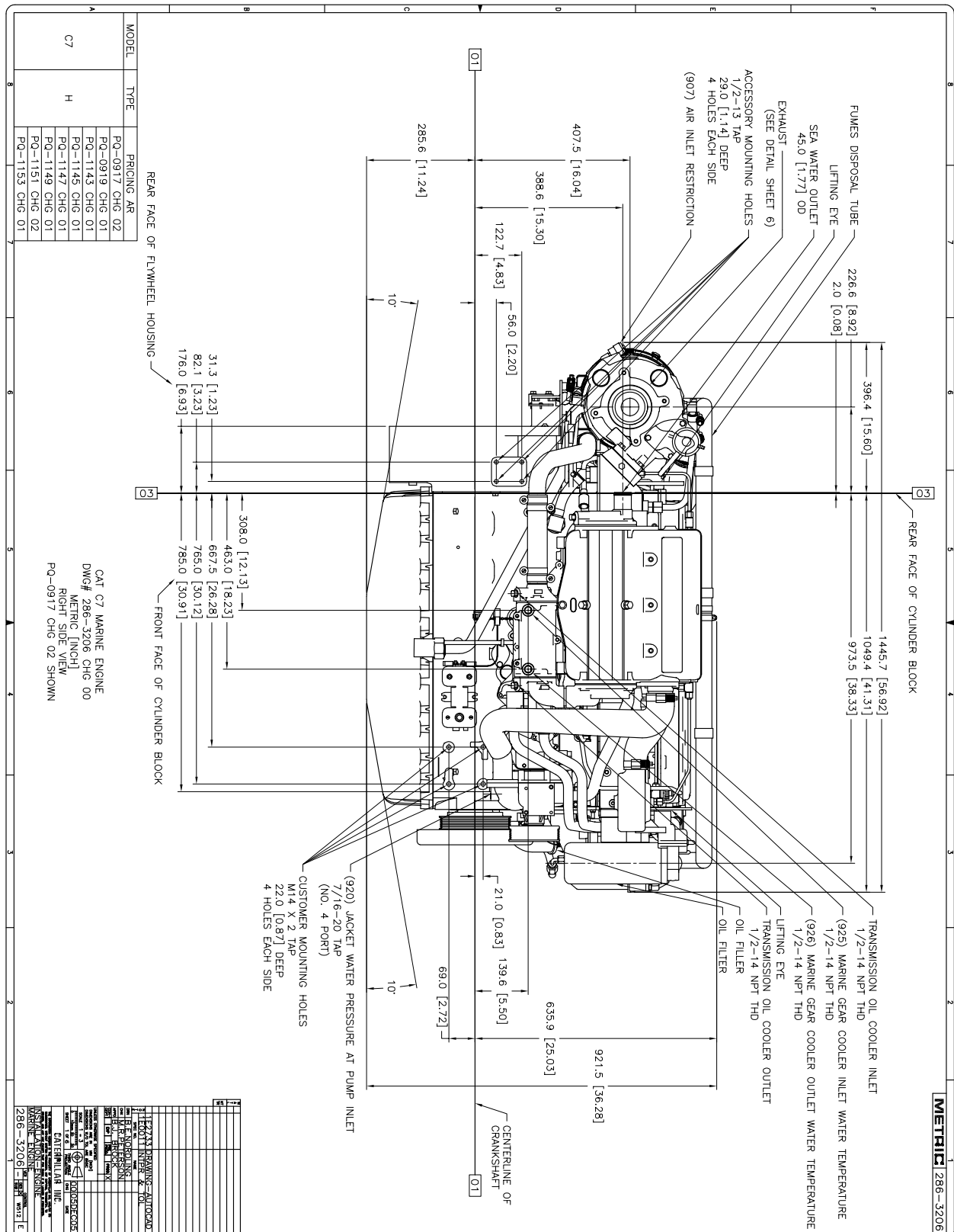
- CAT C7 MARINE ENGINE
- DWG# 286-3205 CHG 00
- METRIC [INCH]
- TOP VIEW
- PQ-0916 CHG 02 SHOWN

Table:

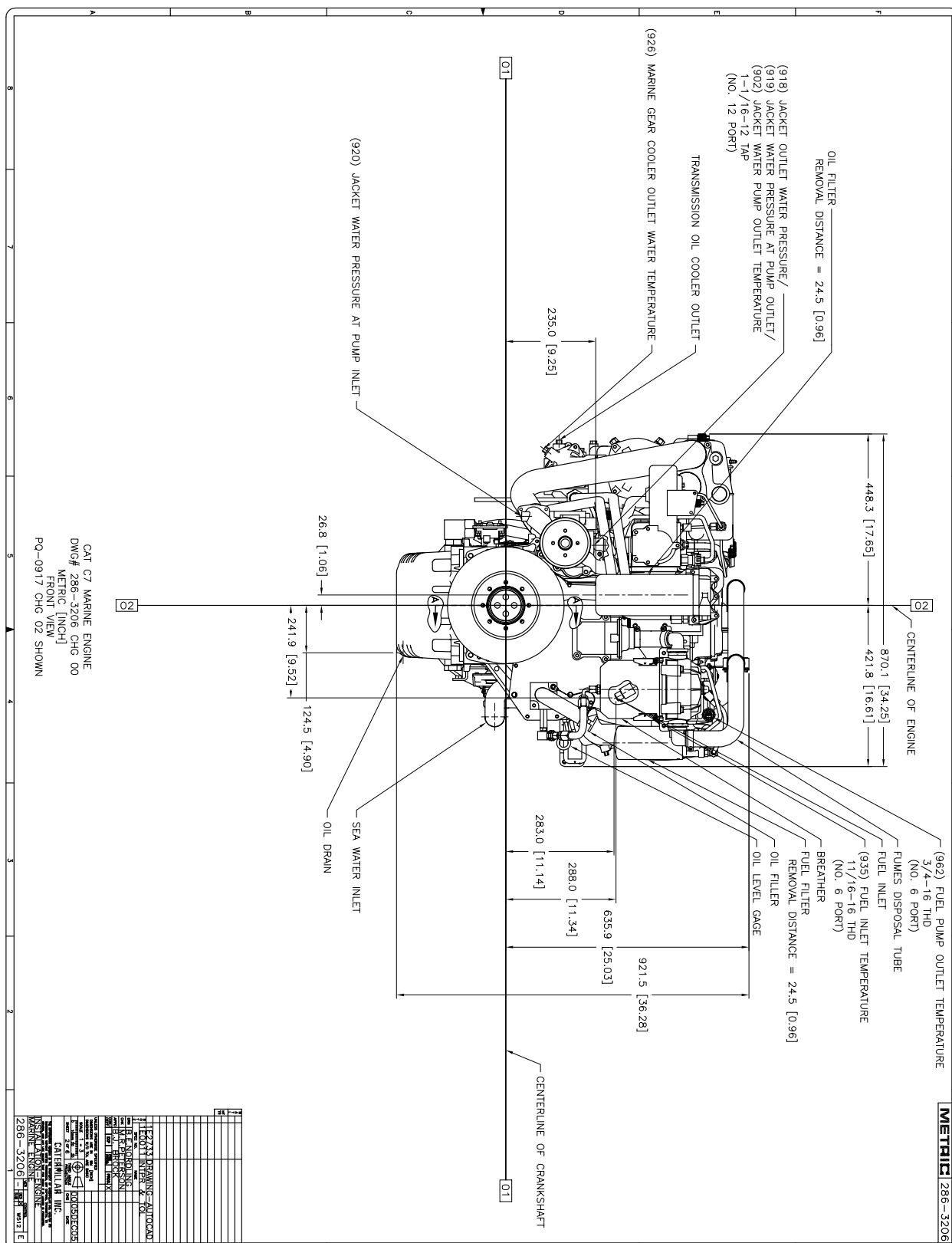
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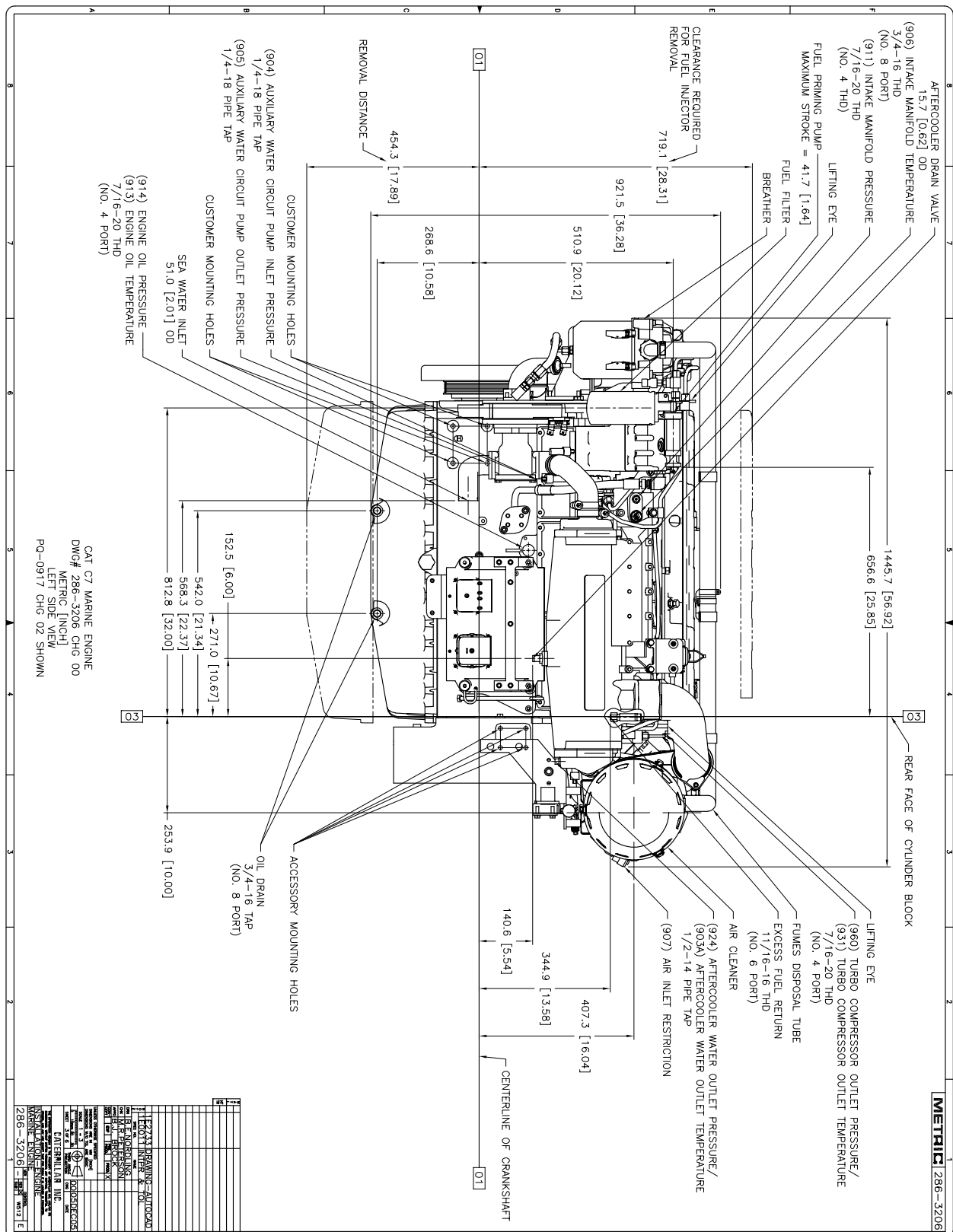
Dimension Drawings — 286-3206



Dimension Drawings — 286-3206

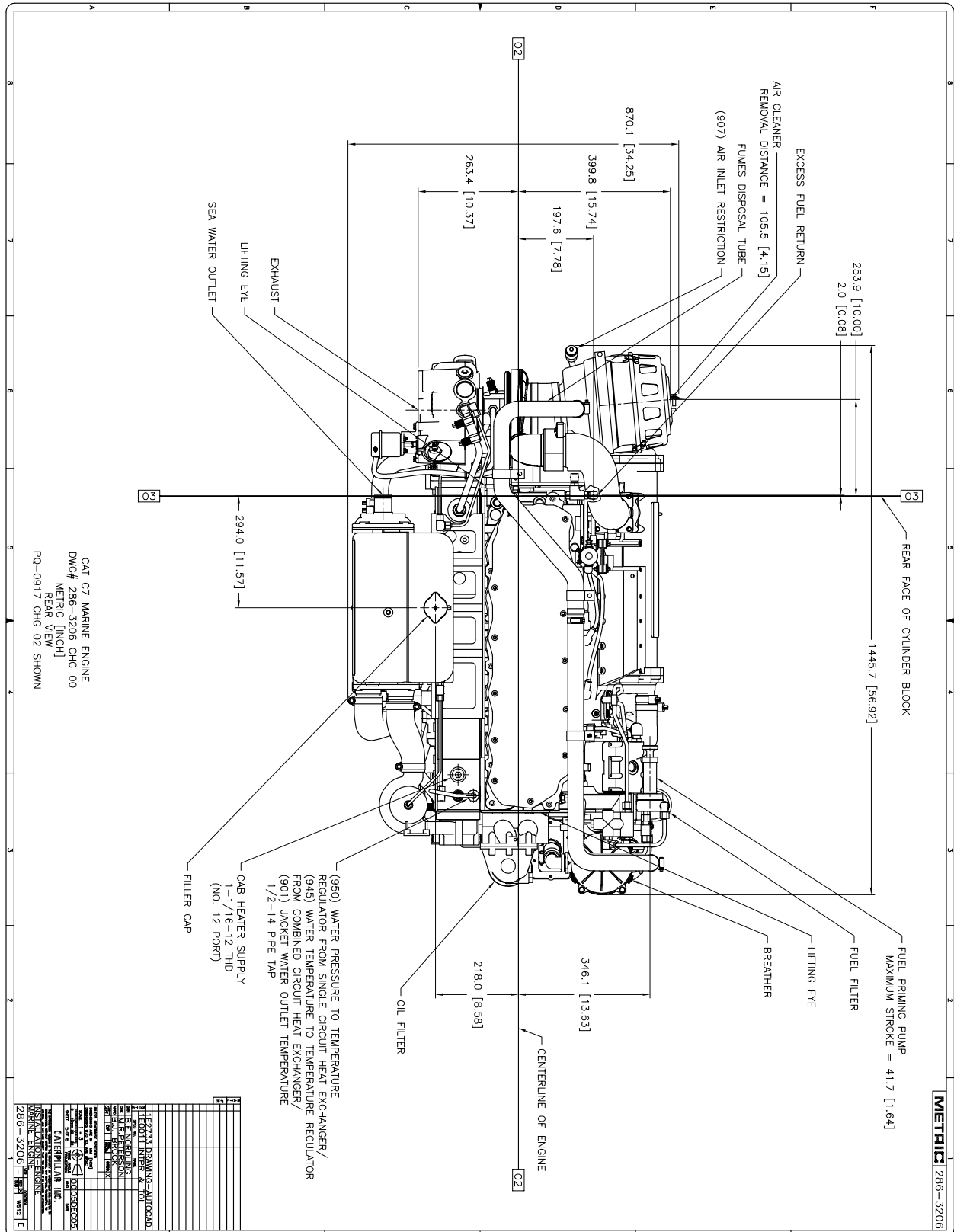


Dimension Drawings — 286-3206



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Dimension Drawings — 286-3206



Dimension Drawings — 286-3206

